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## THE CHINESE COMMUNIST ATOMIC ENERGY PROGRAM

### SUMMARY AND CONCLUSIONS

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Submitted by the  
DIRECTOR OF CENTRAL INTELLIGENCE

The following intelligence organizations participated in the preparation of this estimate: The Central Intelligence Agency, the National Security Agency, and the intelligence organizations of the Departments of State, the Army, the Navy, the Air Force, The Joint Staff, Defense, and the Atomic Energy Commission.

Concurred in by the  
UNITED STATES INTELLIGENCE BOARD

on 13 December 1960. Concurring were The Director of Intelligence and Research, Department of State; the Assistant Chief of Staff for Intelligence, Department of the Army; the Assistant Chief of Naval Operations for Intelligence, Department of the Navy; the Assistant Chief of Staff, Intelligence, USAF; the Director for Intelligence, The Joint Staff; the Assistant to the Secretary of Defense, Special Operations; the Atomic Energy Commission Representative to the USIB; and the Director of the National Security Agency. The Assistant Director, Federal Bureau of Investigation, abstained, the subject being outside the jurisdiction of his Agency.

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# THE CHINESE COMMUNIST ATOMIC ENERGY PROGRAM

## THE PROBLEM

To determine the current status and the probable future course of the Chinese Communist atomic energy program to mid-1965

## SUMMARY AND CONCLUSIONS

### GENERAL

1. Communist China is energetically developing her native capabilities in the field of atomic energy. Since the early 1950's she has been making a concerted effort to develop the corps of scientists and technicians and establish the research facilities essential to the exploitation of nuclear energy. The overall effort has progressed steadily since 1955 with the benefit of a substantial amount of Soviet aid. This assistance has been obtained by the Chinese Communists via negotiated, formal arrangements under which they apparently have maintained a considerable degree of autonomy. However, we believe that the Soviets have provided this aid at a deliberate pace, hoping to postpone the attainment of a native Chinese nuclear weapons capability as long as possible.

### ORGANIZATION

2. There are indications that the control of the Chinese Communist military atomic energy program is currently vested in the Second Ministry of Machine Building. The functions of this ministry have never been made known, unlike other Chinese ministries, and its minister Liu Chieh, is known to have certain interests in the Chinese Communist atomic energy program. We believe that this ministry may be patterned after the Soviet Ministry of Medium Machine Building. The peaceful uses aspects of the program, cover-

ing nuclear research, training, and isotope applications, are largely under the control of the Scientific and Technological Commission of the State Council, with the Institute of Atomic Energy of the Academy of Sciences as the most prominent research establishment.

### TECHNICAL CAPABILITIES

3. The Chinese Communists have acquired a small but highly competent cadre of Western-trained Chinese nuclear specialists. Their nuclear research effort has expanded rapidly since the early 1950's and more than twenty nuclear research facilities have been established at institutes and universities. In addition to the Soviet-supplied research reactor and cyclotron, there are a variety of cyclotrons and other accelerators, most of which are of Chinese manufacture. The Chinese have access, through the Joint Institute for Nuclear Research, to the large Soviet accelerators at Dubna. China's share of the financial costs of the institute is 20 percent, a share exceeded only by that of the Soviet Union. We believe that the widespread Chinese training and research effort is coordinated to the needs of the military atomic energy program. The Chinese Communists are now capable of comprehending and exploiting the large body of open scientific literature in the nuclear sciences. However, the present shortage of trained scientists and engineers will probably persist throughout the period of this esti-

mate. This shortage would hamper Chinese efforts to design, construct, and operate facilities for the production of fissionable materials and would be particularly serious, should the Soviets decide to reduce or terminate their technical aid.

#### URANIUM ORE PRODUCTION

4. The exploitation of native uranium resources has been underway, with Soviet assistance, since 1950. Over 10 deposits are now being worked, and we believe that ore with a uranium metal equivalent of several hundred tons is being mined annually and retained in China.

#### URANIUM METAL

5. The Chinese Communists have probably initiated the processing of uranium ores into metals.

#### FISSIONABLE MATERIALS

6. Chinese development of uranium resources and their probable construction of ore concentration and uranium metal plants certainly would imply an intended use for the uranium in plutonium production. Although uranium metal is not required for U-235 production, the first stages of the process could also supply feed for U-235 separation.

7. We estimate that a first Chinese production reactor could attain criticality in late 1961, and the first plutonium might become available late in 1962.<sup>1</sup> Since there is no conclusive evidence for the date of the uranium

plant startup, and since the construction of reactor and chemical separation facilities has not been directly established, the actual start of plutonium production could be a year earlier or several years later.

8. It is possible that a U-235 plant is now under construction. Considering the magnitude of the developmental work and industrial support required for the construction of a gaseous diffusion plant, however, it is improbable that the Chinese could produce highly enriched U-235 earlier than late 1962.<sup>1</sup>

#### NUCLEAR WEAPONS

9. On the basis of all available evidence, we now believe that the most probable date at which the Chinese Communists could detonate a first nuclear device is sometime in 1963, though it might be as late as 1964, or as early as 1962, depending upon the actual degree of Soviet assistance.<sup>1 2</sup> If the Soviets provide fissionable materials, and assist in the design and fabrication of a nuclear device, the Chinese could produce a nuclear detonation in China at almost any time in the immediate future. On the other hand, if there were a lessening of Soviet assistance in the nuclear field as a result of current Sino-Soviet dissensions, progress would be substantially retarded.

10. While the explosion of a nuclear device would give the Chinese Communists political and propaganda rewards, they would almost

<sup>1</sup> The Assistant Chief of Staff, Intelligence, Department of the Air Force, believes that the Chinese will probably detonate their first nuclear device in 1962, and possibly as early as late 1961. The great political, psychological and military advantages to be gained are such that the Chinese would accord top national priority to the development of a nuclear weapons program. He interprets the available evidence on the production schedule of uranium metal and fissionable material to indicate that in 1959 a uranium metal plant started producing fuel elements for the production reactor which is believed to have gone critical in 1960. The first nuclear device will probably use plutonium from this reactor. Finally, he believes that after late 1961 highly enriched U-235 will be available for subsequent devices.

<sup>2</sup> The Assistant Chief of Naval Operations (Intelligence), Department of the Navy, believes that information on the nature and extent of Soviet aid to Communist China is as yet insufficient for a reliable estimate of the year in which the Chinese Communists could detonate a nuclear device. He considers, however, that certain basic information should have become available to us by this time if the Chinese Communists were progressing toward detonation of a domestically produced nuclear device very much before the final stages of this five-year estimate. In the absence of what he considers to be any evidence pertaining to or indicative of the production of fissionable materials in Communist China and in the light of the relatively elementary state of known nuclear research facilities, he is unable to accept the time schedule for nuclear weapons as given in this paper.

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certainly proceed to create an operational nuclear capability as quickly as feasible. However, at least two years would probably be required after the explosion of a nuclear device to produce a small number of elementary weapons.

#### NUCLEAR POWER

11. Based on known Chinese Communist desire to become a nuclear power, we believe that production reactors would be given precedence over reactors designed for nuclear power. Further, we do not believe that the Chinese would complicate the design of their first production reactors in an effort to extract by-product power. We estimate that the Chinese will not construct nuclear power stations in the 1960-1965 period.

#### SOVIET ASSISTANCE

12. Soviet assistance has been an important factor in the Chinese atomic energy program.

Under an agreement for cooperation concluded in 1955, the Soviets have provided to the Chinese a research reactor, cyclotron, technical assistance and training. A Sino-Soviet Scientific and Technical Agreement for the years 1958-1962 was concluded in 1958. Other known Soviet aid has been largely concerned with uranium prospecting. We have no firm evidence of Soviet assistance in designing or constructing fissionable materials production facilities or in supplying the materials or equipment needed for such production.

13. There is some evidence that Soviet aid may have been curtailed, based on reports that a general withdrawal of Soviet technicians from China took place in mid-1960. Such diminution of aid in the Chinese Communists' atomic energy program would substantially retard China's progress in becoming a nuclear power.